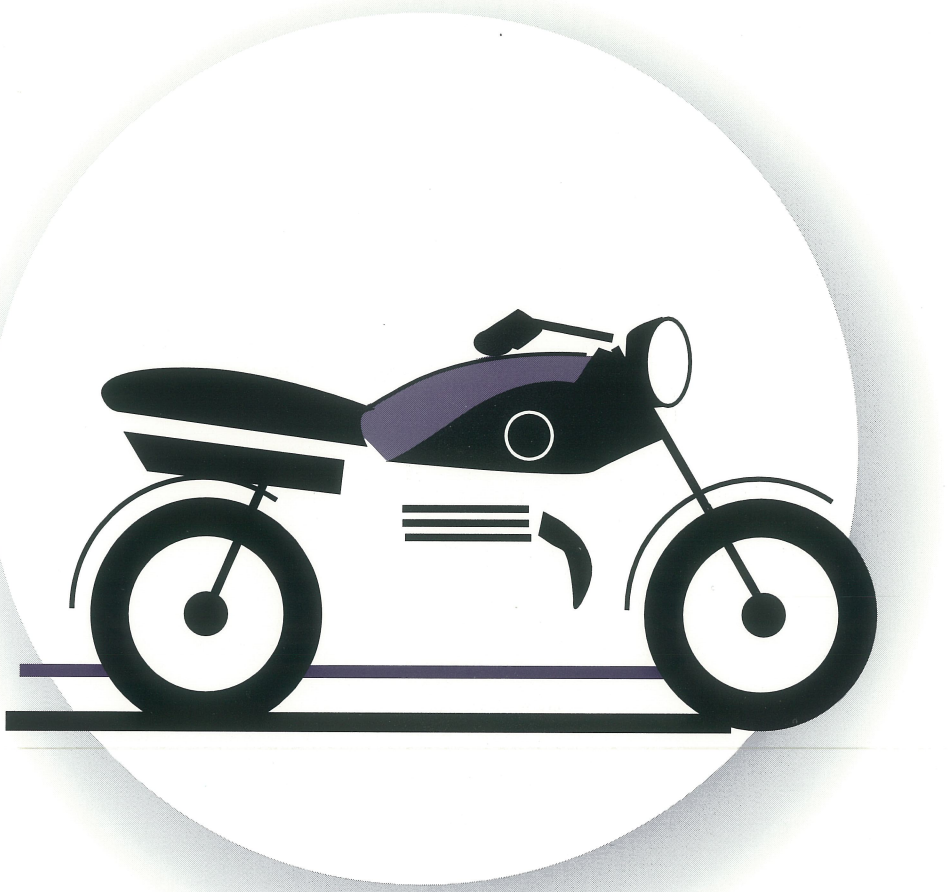
Motorcycles

Motorcycles

1999 INSPECTION HANDBOOK

Includes Recommended Procedures
for the United States and Canada



Published by the
American Association of Motor Vehicle Administrators

CCMTA • CCATM

In Partnership with the
Canadian Council of Motor Transport Administrators

Contents

Introduction

The American Association of Motor Vehicle Administrators (AAMVA) in partnership with the Canadian Council of Motor Transport Administrators (CCMTA) is proud to offer this section of the new, expanded edition of the *Vehicle Inspection Handbook Set,* with recommended minimum inspection procedures and standards for all types of vehicles in the United States and Canada including:

- Motorcycles,
- Passenger Vehicles & Light Trucks,
- Salvage Vehicles,
- Trucks, Buses & Trailers, and
- Emissions.

Each handbook section contains information compiled from multiple sources and is based on actual working systems and programs in the United States and Canada.

To order additional handbook sections, use the order from provided with this manual or contact AAMVA (703-522-4200). In Canada, contact CCMTA (613-736-1003).

Motorcycle Safety Inspections

Motorcycle safety inspections ensure the safe operation of motorcycles on public roadways by verifying that the operating systems and components are in safe operating condition and by identifying any unsafe or potentially unsafe conditions that need to be corrected.

For this publication, motorcycles are generally defined as motor vehicles having two or three wheels. That includes a wide range of vehicles from small scooters to high performance sport machines, as well as three-wheeled vehicles. Motorcycles also may be highly modified, reconstructed or salvage vehicles with two or three wheels that require special attention by inspection stations and registration authorities.

It does not cover vehicles that are not subject to registration such as all-terrain vehicles, mini bikes, competition bikes, and motorcycle-like vehicles with a wheelbase that is less than 39 inches (1000 mm) between the front and back wheels measured from the centerline, and vehicles with tire rims less than 10 inches (250 mm) in diameter.

How To Use This Handbook

Designed for use by government officials, fleet operators, inspection managers and others who want to update or enhance existing procedures or develop new inspection programs, this handbook provides practical, up-to-date inspection procedures, and minimum recommendations and rejection criteria for motorcycles. It also is intended to serve as a useful teaching tool for inspection training programs and as a resource guide for maintenance programs.

These guidelines also will provide information that will help motorcycle operators with the routine maintenance of their vehicles so that they will be safe to operate at all times, not just when inspections are required.

Every effort has been made to provide specific inspection recommendations, except where jurisdictions vary widely on what is acceptable, or where there is a broad range of acceptable conditions depending on the type of vehicle that is being inspected. In those instances, recommendations in this handbook rely on and refer to recognized industry specifications and

limits, directly or indirectly, through the use of terms such as "properly," "adequate," "inadequate," "excessive", "perceptible," etc.

In addition differences between Canadian and United States minimum recommendations or procedures are clearly noted in the text by a maple leaf icon for Canada and a stars and stripes icon for the United States.

Also, please note that some jurisdictions may have more stringent requirements than the ones set forth in this handbook.

Based on Information from U.S. and Canadian Experts

This handbook is based on the *1997 Motorcycle Inspection Handbook,* prepared by the Motorcycle Industry Council. It was revised and expanded by members of AAMVA's Handbook Working Group, which is part of AAMVA's Engineering and Vehicle Inspection Committee. Information in the handbook was also reviewed and/or provided by representatives from CCMTA and the Motorcycles and Moped Industry Council.

The recommendations presented in this handbook reflect the majority view of the AAMVA Handbook Working Group, but every recommendation is not necessarily endorsed by each reviewer.

Handbook Set Reflects Experience and Cooperation

AAMVA has been involved in publishing vehicle inspection handbooks since the late 1980s, when AAMVA and the National Highway Traffic Safety Administration began working cooperatively to publish handbooks for passenger vehicles and trucks and buses with information provided primarily by the American Automobile Manufacturer's Association.

In 1995, AAMVA published the first edition of the *Vehicle Inspection Handbook* for passenger vehicles. A year later, AAMVA's Engineering and Vehicle Inspection Committee began developing this expanded edition of the handbook to provide inspection recommendations for all types of vehicles.

In 1997, CCMTA offered its manual, *Commercial Vehicle Inspections in Canada,* as the basis of the *Trucks, Buses & Trailers Inspection Handbook,* and AAMVA and CCMTA agreed to collaborate on the publication of the entire handbook set.

Because it includes recommendations for both the United States and Canada, the *Vehicle Inspection Handbook Set* is an important step toward the harmonization of standards in North America.

Jurisdictional Inspection Programs Improve Highway Safety

Billions of dollars are spent annually to design and construct highways that provide a safe environment for vehicular travel. Laws defining unacceptable conduct and conditions are enacted by legislators and enforced by employees of governmental entities, and minimum driver standards and requirements are developed for those applying for a driver's license. Yet, many jurisdictions leave to chance that people voluntarily will maintain the safety components of their motorcycles.

To provide the optimal conditions for the safe operation of motorcycles, all of the necessary elements of a highway safety program—the highway, the driver and the motorcycle—must work together.

By identifying defective motorcycle parts before they fail, well-run, effective periodic motor vehicle inspection (PMVI) programs could prevent motorcycle failure on the highways and prevent crashes that might result in injuries or death.

Currently, 35 jurisdictions in the United States and seven Canadian provinces have PMVI programs that require periodic or random motorcycle inspections or inspection of motorcycles at the point of sale.

PMVI programs have become increasingly important as people keep their vehicles for longer periods of time than they have in the past. As these vehicles age, they begin to wear out and become unsafe. Motorcyclists also may be less aware of the mechanical condition of their vehicles today than in years past. With the elimination of full-service gas stations, most elementary preventive maintenance checks are ignored.

While roadside inspections by law enforcement officers serve to remove some unsafe motorcycles from our highways, it is impractical to assume that this type of inspection has a significant impact on highway safety. Such inspections are limited by the number of officers available to perform inspections, the individual officer's competence to conduct such inspections, and the equipment available to perform the inspection. No jurisdiction has a sufficient number of law enforcement officers to ensure that even a small percentage of the motorcycles traveling within that jurisdiction can and will be inspected within any given time period.

On the other hand, periodic inspections serve to verify the integrity of the motorcycle's critical safety components that are necessary to ensure that it is in safe operating condition.

Recommendations for Jurisdictional Programs

Based on the experience of existing inspection programs, jurisdictions that are establishing or updating a motorcycle inspection program are encouraged to:

- Review and improve established programs for their effectiveness in identifying defective components or unsafe conditions that could cause or contribute to motorcycle accidents.

- Inspect registered motorcycles at least once every 12 months. Inspection prior to sale or at the time ownership is changed is less than adequate. However, inspections conducted at these times, in addition to a regular PMVI program, would provide the most effective inspection program.

- Include significant inspection items into a "tips for safe riding" handout as part of motorcycle operator licensing materials to further improve motorcycle safety.

- Check for agreement among the registration certificate, license plate, vehicle description and vehicle identification number(VIN), and check the VIN to ensure that it has not been altered or defaced. This will help identify stolen motorcycles and deter vehicle fraud.

- Inspect the license plate mounting and condition for evidence of tampering, and ensure that the plate is not obscured, illegible or mounted insecurely.

- Request and check for a valid motorcycle operator's license, endorsement or learner's permit. If the operator does not have valid documents, the motorcycle should be impounded until the operator or the owner produces a valid document. **Note:** This procedure should be conducted only by an official with law enforcement authority.

- Clearly state pass/fail standards and review those standards periodically for compatibility with existing vehicle technology.

- Distribute motorcycle registrations over a 12-month period so that all registrations and inspections are not due at the same time.

- Develop uniformity in the inspection process among the stations performing inspections. This is essential to ensuring the effectiveness of the program and maintaining the credibility of the program.

- Seek legislation that will provide for greater PMVI reciprocity with other jurisdictions that have equivalent PMVI programs.

Recommended Frequency of Inspection

Inspecting motorcycles at least once every six months provides optimal safety results. However, most PMVI jurisdictions have found that mandatory motorcycle inspection every six months overburdens inspection facilities and personnel, creates some negative public reaction and is not politically acceptable.

Thus, while more frequent inspection is desirable, jurisdictions should require every motorcycle to undergo an inspection of its safety components at least once every 12 months.

Compliance and Enforcement

Most PMVI jurisdictions use the inspection sticker concept to identify motorcycles that have passed safety inspection standards. Such programs are effective and law enforcement officials can easily identify motorcycles that are not in compliance. Registration tie-in also would deter the theft and counterfeiting problems experienced by some jurisdictions.

General Definitions*

Motorcycle. A motor vehicle with motive power having a seat or saddle for the use of the rider and not more than one passenger and designed to travel on not more than three wheels in contact with the ground.

Motor-driven Cycle. A motorcycle with a motor that produces 5-brake horsepower or less.

Moped. A motor-driven cycle with a power source of not more than two gross brake horsepower and a piston or equivalent rotor displacement of less than 50 cubic centimeters (cc), whose speed attainable in one mile is 30 miles per hour (48km/h) or less when accelerating at full throttle on a level surface. **Note:** A moped may or may not be equipped with pedals.

Reconstructed—Specially Constructed Motorcycle. A vehicle assembled from new or used parts by other than a recognized manufacturer of motorcycles; or a vehicle that is modified to the extent that the original identity of make, model or type is obscured by material changes in appearance; or is modified by the removal, addition, alteration or substitution of parts other than original replacement essential parts.

Sidecar. An accessory third wheel attached to either side of the motorcycle, generally for the purpose of transporting persons or property.

*Please note that jurisdictions may use different definitions.

Motorcycle Frame & Swing Arm

1. The Frame

The frame is the basic structural component of the motorcycle to which the other components of the motorcycle are attached. The main frame assembly and the front fork assembly constitute the vehicle.

Procedure

Visually inspect the frame for cracks, breaks, twists, compressed tubing, and structural damage to gussets without removing or disassembling any body plastic or component.

Reject the motorcycle if:

- The frame is cracked, broken or twisted, or there is evidence of structural damage.
- The frame is bent in such a way that the wheel tracking alignment exceeds the limits defined under *Chapter2.6—Steering Alignment.*

Example of a Swing Arm

2. Swing Arm Operation

When fitted, the swing arm extends rearward from the swing arm pivot axis, which is generally located at the lower rear portion of the frame or the rear portion of the engine and attached to the rear wheel axle. Typically, shock absorbers are fitted between the swing arm and the frame. No shock absorbers are fitted on a rigid frame (hardtail), and the rear wheel axle is attached directly to the main frame.

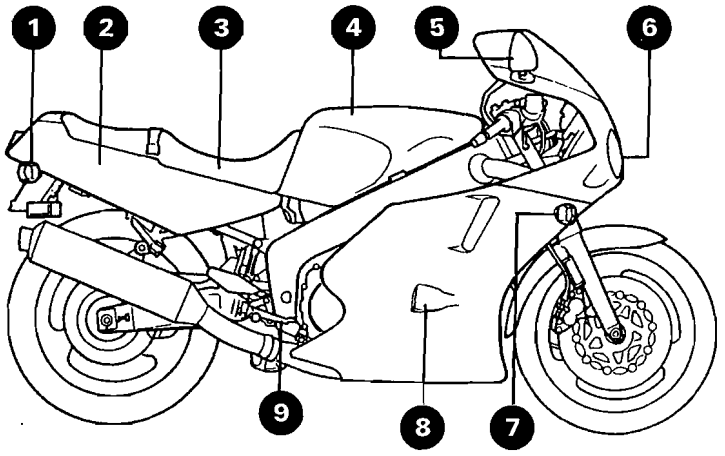
Procedure

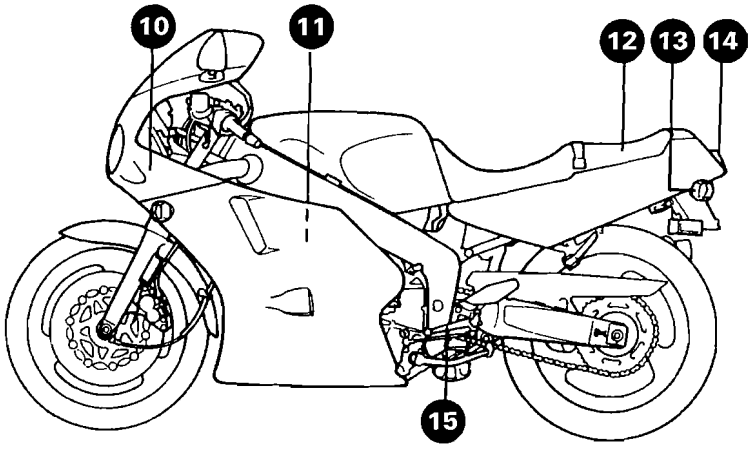
Step 1: Inspect the swing arm bushing or bearing for wear or looseness. Check for evidence of lateral movement of the swing arm by exerting side-to-side force against the rear wheel.

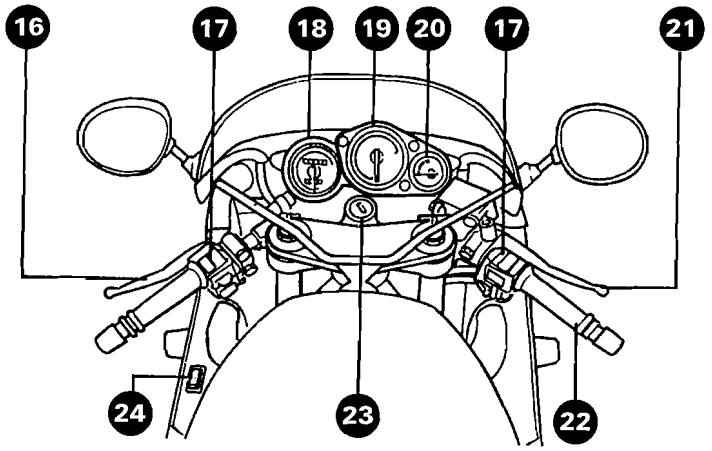
Step 2: Inspect the swing arm for proper alignment by observing how the wheels track.

Reject the motorcycle if:

- The swing arm is bent, cracked, broken or loose.
- The wheels won't track properly and adversely affect control of the motorcycle. (Refer to *Chapter 2.6—Steering Alignment.*)







Typical Motorcycle Parts *

1. Rear turn signal
2. Side cover
3. Seat
4. Fuel tank
5. Rearview mirror
6. Headlight
7. Front turn signal
8. Lower cowl
9. Brake pedal
10. Upper cowl
11. Choke
12. Passenger seat
13. Helmet holder
14. Tail stop lamp
15. Shift pedal
16. Clutch lever
17. Handlebar switches
18. Speedometer
19. Tachometer
20. Engine temperature gauge
21. Brake lever
22. Throttle grip
23. Ignition switch
24. Fuel (Reserve) switch

* *May vary depending on the make and model.*

Steering & Suspension

Steering and Suspension Terms

Front fork. The mechanism between the steering head and the front wheel axle.

Front fork assembly. The connected set of components that pivots as a unit about the steer axis. It includes, for example, the handlebars, forks, lights, fender, front wheel, tire and brake, etc.

Handlebars. The attachments to the front forks or steering shaft used to control steering.

Handlebar controls, levers, cables. A throttle control (twist grip) is located on the right handlebar. Control cables normally attach the throttle control to the carburetor or fuel injection system and the handlebar levers to mechanical front brakes and the clutch. In the case of hydraulic brakes and clutches, fluid tubes are used in lieu of cable attachments. Rear brake controls may be located on the left handlebar if the motorcycle is equipped with an automatic clutch. Motorcycles equipped with self-proportioning or anti-lock ABS devices may have a single brake control operated by the right hand or foot. **Note:** Classics or antiques may not be so equipped and need not conform to these requirements.

Handlebar mounts. Devices for attaching the handlebars to the forks or steering shaft, clamping to fork legs or to the top fork lug; such as "U" bolts, clamps or rubber mounted brackets.

Loaded. The condition where the wheel or wheels of the motorcycle are on a level surface, bearing the full weight of the motorcycle and rider.

Play. Any free movement of a component except a wheel on its axis of rotation, or suspension travel in the vertical plane.

Rake angle (caster angle). The acute angle measured in the longitudinal plane of symmetry between the fork assembly axis or kingpin axis and the vertical.

Shock absorber. A device to control suspension motions by producing reactive forces that are functions of velocity and position.

Steering head. The top front part of the main frame assembly that contains the mount, bearings and steering stem for the front fork assembly.

Steering stops. Mechanical obstructions that limit the maximum fork rotation.

Trail. Generally, the horizontal distance from the point where the steer axis intersects the roadway and the tire contact point.

Wheel plane. The central plane of the tire-wheel system, perpendicular to the axis of rotation.

1. Steering Head Bearing(s)

Procedure:

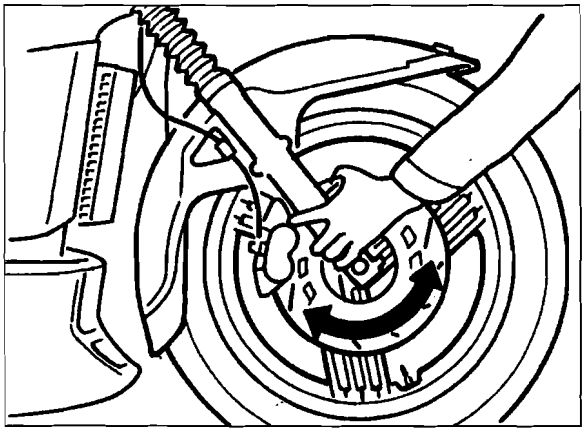
Step 1: Inspect for loose adjustment or play in the steering head bearings by placing the motorcycle on the center stand or a frame jack/lift with the front wheel raised so that it does not bear any weight.

Step 2: Grasp the left and right fork legs at the axle and apply alternating force forwards and backwards. Inspect for loose or over tight bearing adjustment or play in the steering head bearings.

Step 3: Turn the handlebars slowly from side to side and inspect for bearing roughness during rotation.

Reject the motorcycle if:

- There is noticeable play or roughness within the steering head bearings. Note: Drag from the steering damper, if one is fitted on the motorcycle, or from cables or wiring is not cause for rejection.
- The steering does not rotate smoothly from stop to stop.



Steering Head Bearing

2. Wheel Bearings

Procedure:

Step 1: To inspect the front wheel bearing, place the motorcycle on a center stand or frame jack/lift with the front wheel raised so that it does not bear any weight of the vehicle. To inspect the rear wheel bearing, raise the rear wheel in the same manner.

Step 2: Check for wheel bearing looseness. Grasp the tire at the top and bottom and apply a rocking force from side to side.

Step 3: Spin the wheel and check for bearing roughness, noise and vibration.

Reject the motorcycle if:

- The wheel bearings have perceptible play, roughness or binding during wheel rotation.

3. Handlebars

Procedure

Step 1: Inspect the handlebars for the presence of cracks, proper alignment, mounting height, width and installation of handgrips.

Reject the motorcycle if:

- The handlebars are cracked, broken or misaligned. Note: Do not reject the motorcycle if the handlebar alignment can be satisfactorily adjusted during the inspection.
- The handlebars are positioned so that the handgrips are at a level above the operator's shoulder height when the operator is sitting astride the seat, or the rise is more than 15 inches (380 mm) above the operator's seat, whichever is less.
- The handlebar width measures less than 18 inches (460 mm) or greater than 36 inches (920 mm) from grip end to grip end.
- Handlebars are not equipped with handgrips.

4. Handlebar Controls

Procedure:

Step 1: Inspect the throttle (twist grip), clutch lever, brake lever and all clutch and brake cables.

Note: Hydraulic components are covered under the brake system.

Reject the motorcycle if:

- The throttle does not automatically close to an idle when it is released from the full open position on motorcycles manufactured after September 1, 1974. Note: Some throttles have an intermediate resistance point for idle adjustment.
- The throttle or control levers are loose on the handlebars.
- The control levers are broken or do not operate freely.

Step 2: Inspect the cable housings for pinch and kinking damage, and check the exposed portion of the inner cables for loose ends, severe bends, kinks and broken strands.

Reject the motorcycle if:

- The outer cable housing is pinched or kinked.
- There are loose cable ends, severe bends, kinks or broken strands on the exposed portion of the inner cables.

Step 3: Inspect the brake control lever and the clutch control lever for free play and reserve. Note: Some motorcycles may be equipped with a hydraulic clutch. If so, inspect as for a brake control.

Reject the motorcycle if:

- The brake control lever has no free play, and less than 1/5 of the total available control travel remains when the brake force is applied.
- The clutch control lever has no free play, and the clutch lever travel bottoms prior to full clutch disengagement.

Step 4: Inspect for a supplemental engine stop control switch if the motorcycle was originally equipped with one. Note: A supplemental engine stop control switch was required on all motorcycles manufactured after September 1, 1974.

Reject the motorcycle if:

- It is not equipped with an operable supplemental engine stop control.

5. Shock Absorbers

Procedure

Inspect the shock absorbers, if so equipped, for fluid or gas leaks, rebound damping and attachment.

Note: Motorcycle designs may incorporate two rear wheel shock absorbers, a single rear wheel shock absorber or no rear shock absorber. Also, front wheel damping may be achieved hydraulically by a combination of hydraulics and air or mechanical springing.

Reject the motorcycle if:

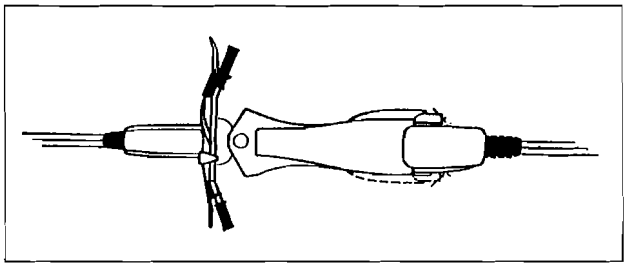
- Shock absorbers are not securely attached or missing.
- The shock absorbers do not damp or are bent. Note: Shock absorbers that show evidence of seepage are not cause for rejection. They are, however, an advisory item, and the operator must be made aware of the condition.

6. Steering Alignment

Procedure

Visually inspect the front wheel to rear wheel alignment and the alignment of the front wheel to the front fork tubes.

Note: For ease of inspection, a series of three reference lines, 1 inch (25 mm) apart, on the floor of the inspection area may be used. Center the front tire on the center reference



Steering Alignment

line and observe tracking of the rear wheel as the motorcycle is moved forward along the line.

Reject the motorcycle if:

- The wheel planes do not align with the longitudinal axis of the frame, causing tracking between the front and rear wheel to misalign by 1 inch (2.5 mm) or more.
- The front wheel plane is not vertical and parallel to the front fork tubes.
- The front fork tubes are bent or damaged so as to prevent full travel and free action of the front forks.

7. Steering Head

Procedure

Visually inspect the frame at the steering head for cracks, irregular welds and evidence of grinding.

Reject the motorcycle if:

- There is a crack in or adjacent to any weld.

  Note: If irregular frame welds occur at the steering head recheck the VIN for possible alteration and validity.

Tires, Wheels, Rims & Spokes

Related Terms

Bead. That part of a tire made of embedded steel wires, wrapped or reinforced by ply cords, that is shaped to fit the rim.

Cord. The textile and steel wire strands forming the plies in the tire.

Groove. The space between two adjacent tread ribs.

Ply. A layer or rubber-coated parallel cords forming the tire body.

Rim. The support for a tire or a tire and tube assembly upon which the tire beads are seated.

Sidewall. That portion of a tire between the outer edges of the tread and the bead area.

Spokes. The rods or braces that connect the hub with the rim of a wheel.

Tread. That part of the tire that contacts the road surface.

Tread rib. A tread section element running around the circumference of a tire.

Treadwear indictor. The raised portion of the base of the tread groove that appears locally smooth when the tread is worn to a predetermined depth indicating that it is time to remove the tire from service.

1. Tires

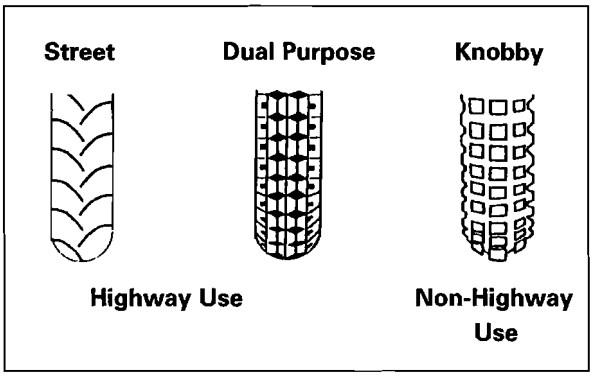
Procedure

Step 1: Visually inspect the tires for wear, cuts, cord exposure, sidewall cracks, bulges or tread separation.

Reject the motorcycle if:

- Any tire is worn to the level of the treadwear indicators.
- A tire without treadwear indicators on a motorcycle registered in the United States has less than 1/32 inch (0.8 mm) of design tread depth remaining measured at the point where the tread is the thinnest in any groove.
- Less than 2/32 inch (1.6 mm) of tire tread remains on a motorcycle registered in Canada.
- Any part of the cord is exposed.
- There is any sidewall bulge or tread separation.

Step 2: Check the tires for manufacturer's markings that designate usage restrictions.



Motorcycle Tires—Typical

Reject the motorcycle if:

- The tires have manufacturers markings such as "not for highway use," "for racing purposes only," "unsafe for highway use," or "NHS," etc.

Step 3: Inspect for regrooved or recut tires.

Reject the motorcycle if:

- The tires have been regrooved or recut. Note: Motorcycle tires are not designed to be regrooved or recut.

2. Wheels, Rims and Spokes

Procedure

Inspect for loose or missing spokes, and inspect the wheels for structural integrity.

Reject the motorcycle if:

- Any spokes or braces are broken or missing, or spokes are visibly loose.
- Any part of the wheel rim is cracked or broken.
- Any brace, disc, strut or spider is cracked or broken.

Brakes

Related Terms

Brake control reserve. The amount of brake control travel remaining in reserve when the brake control is fully actuated. **Note:** The purpose of the brake control reserve check is to ascertain the degree of the brake adjustment.

Brake control lever/pedal free play. Acceptable amount of control movement prior to system activation.

Brake disc or rotor. The parallel-faced circular rotational member of a disc brake assembly acted upon by a frictional material.

Brake drum. The cylindrical rotational member of a drum brake assembly acted upon by the friction material.

Brake pad. The friction material faced (pad) mechanical component of a disc (caliper) brake system.

Brake shoe. The friction material faced (lining) mechanical component of a drum and shoe brake system.

Brake wear indicator. Device for visually determining the amount of wear on disc pads and shoe linings. Typically, an arrow or index mark on the brake arm that aligns with a reference scale on the brake panel for lining wear and a red line or "step" molded into the edge of disc pads indicating the minimum acceptable pad thickness.

Braking (stopping) distance. The distance traveled by a motorcycle measured from the point of application of force to the brake controls to the point at which the motorcycle reaches a full stop.

Hydraulic service brake system. A brake system in which the brakes are applied hydraulically. **Note:** May incorporate mechanical subsystems.

Mechanical service brake system. A brake system in which the brakes are applied by mechanical means through the use of cables, rods and linkage.

Parking brake. A friction type brake with a solely mechanical means to retain engagement. Required on three-wheeled motorcycles and sidecar wheels.

Service brake system. A combination of one or more brakes and their control devices. The service brake system must provide braking capability to each wheel, except the sidecar.

Split service brake system. A brake system consisting of two or more subsystems actuated by a single control, designed so that a leakage-type failure of a pressure component in a single subsystem (except structural failure of a housing that is common to all subsystems) must not impair the operation of the other subsystem(s).

1. General Brake Requirements

Procedure

Inspect the motorcycle to ensure that it is equipped with a brake on each wheel.

Reject the motorcycle if:

- Any wheel is not equipped with an operational brake.

2. Hydraulic Brake System

Procedure

Step 1: Inspect the hydraulic hoses, tubes and connections for deterioration, leaks, routing and support.

Step 2: Inspect the master cylinder for leaks, fluid level and control adjustment.

Reject the motorcycle if:

- Hoses or tubes (lines) are leaking, worn so that the fabric layer is exposed, chafed, pinched, cracked or insecurely fastened.
- The master cylinder reservoir is less than 1/4 full or the low fluid warning light is on.
- The master cylinder leaks or is not securely mounted.

Step 3: Apply the brakes.

Reject the motorcycle if:

- Hoses swell or bulge when brake pressure is applied.
- Pressure cannot be maintained for 10 seconds.

Step 4: Inspect the wheel brake assembly.

Reject the motorcycle if:

- There is fluid leakage around the wheel brake assembly.

Step 5: Inspect the caliper action for disc to pad clearance.

Reject the motorcycle if:

- The caliper fails to actuate or release.
- Full actuation of the brake control fails to fully apply the brake at the wheel.

Step 6: Inspect the brake control lever/pedal for free play and reserve.

Reject the motorcycle if:

- The brake control lever/pedal has no free play, and less than 1/5 of the total available control travel remains in reserve when the brake force is fully applied.
- The brake system warning light does not function.

3. Brake Lining and Disc Pad

Procedure

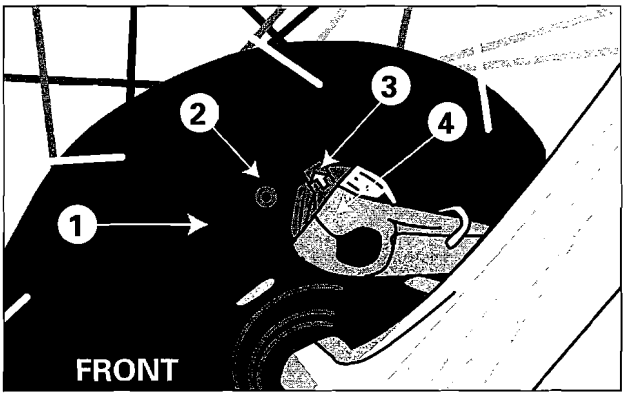
Inspect all brake linings and disc pads where visible without removing the wheel.

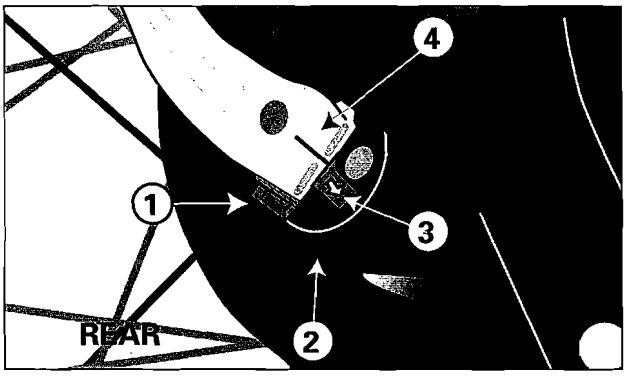
Notes:

- All motorcycles manufactured after January 1, 1974, provide a way to visually inspect the brake lining and pad wear.
- Only remove wheels for brake inspections when the motorcycle fails a stopping test. (See *Chapter 4.5, Step 6.*)

Reject the motorcycle if:

- The brake lining wear arrow or index mark indicates "off-scale," "unsafe" or "replace" on the reference scale.
- The bonded lining is worn to 2/32 inch (1.6 mm) at the thinnest point on the brake shoe or pad.





Typical Drum and Shoe Type Brakes

As the brake is applied, an arrow (3) attached to the brake arm (4) moves toward a reference mark (2) on the brake panel (1).

- Rivet-type lining is worn to within 2/32 inch (1.6 mm) above the rivet heads on the brake shoe and within 2/32 inch (1.6 mm) on the pads.
- The lining is loose, cracked, broken or contaminated with oil, grease or brake fluid.

4. Brake Drum and Discs

Procedure

Visually inspect the drum for external cracks or breaks. Inspect the disc for scoring, cracks, breaks, distortion and contaminated friction surface.

Reject the motorcycle if:

- There are any cracks extending to the edge of the drum or disc.
- The disc is scored to the extent that remachining would exceed the manufacturer's limits.
- Any drum diameter exceeds the maximum diameter recommended by the manufacturer.
- The thickness of any disc is less than the minimum thickness recommended by the manufacturer.

5. Mechanical Brake System

Procedure

Step 1: Inspect all cables, linkage, pins, springs, pivots and bearings for excessive friction, wear and broken parts.

Reject the motorcycle if:

- Cotter keys or spring clips are broken or missing.
- Pins or clevises are visibly worn.
- The front brake cable is routed so that it is pinched between any portion of the front fork and frame.

Step 2: Inspect the actuating camshaft for wear and looseness in the backing plate bushing.

Step 3: Inspect the pedal shaft and bearings for wear and alignment.

Step 4: Inspect the brake shoes/pads to see if they return to a disengaged position when the brake control is released.

Step 5: Inspect the front brake lever and rear brake lever or pedal for reserve when the brake is fully applied.

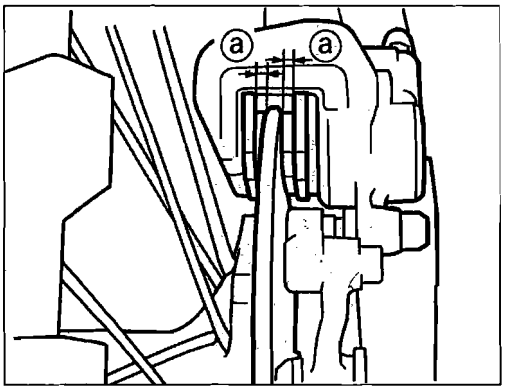
Reject the motorcycle if:

- The brake pedal or lever is inaccessible for operating the brake.
- There is excessive friction or wear in levers, pedals, cables, linkage or other brake components that restrict the automatic return of levers and pedals to their normal positions when they are released from the applied "ON" position.
- The brake control/lever pedal has no free play. Less than 1/5 of the total available control travel remains when the brake force is fully applied.

Step 6: Conduct a road test to inspect the brakes if a visual inspection of the brake system components creates doubt about the performance capability of the total braking system. Such on-road testing should be performed only by an inspector who possesses a valid motorcycle operator's license. **Note:** Do not perform this test unless the brakes are operational and have met all of the above criteria.

Reject the motorcycle if:

- Application of maximum braking force fails to stop the motorcycle within a distance of 20 feet (6 m) from a speed of 20 miles per hour (30 km/h).



Measuring Typical Brake Pad Thickness (a).

Exhaust Systems

The exhaust system includes all components and piping extending from the engine exhaust port to the point of exhaust gas discharge.

Procedure

Step 1: Inspect the exhaust system for the presence of a sound muffling device, broken mounts, removal of internal baffles or packing, and the addition of any cut-out or bypass device.

Reject the motorcycle if:

- Muffler internals have been removed.
- The exhaust system is equipped with any bypass or cutout device.
- Any mounting or connection is loose, broken or missing.

Step 2: Inspect for unshielded protrusions or any portion of the exhaust system that is mounted higher than the lowest part of the passenger seat pan.

Reject the motorcycle if:

- Any unshielded part of the exhaust system protrudes in a manner that might burn the rider or passenger when seated in a normal position.
- Any unshielded portion of an exhaust system is mounted higher than the lowest portion of the passenger seat pan.

Fuel System

The fuel system includes the combination of fuel tank, fuel lines, pump, filter and vapor return lines, carburetor or injection components and all fuel system vents and evaporative emissions control systems or devices.

Procedure

Step 1: Inspect the fuel tank, fuel tank supporting brackets and hardware, fuel tank cap, fuel control ("ON" / "OFF") valve, fuel tubing, clamps and hoses, and carburetor or injectors.

Reject the motorcycle if:

- Any portion of the fuel system is not securely attached.
- Fuel is leaking from any point in the system.
- The tank cap is missing, damaged or fails to latch.

Lighting & Electrical Systems

Related Terms

Indicator lamp(s). Lamps visible to the driver that indicate appropriate electrical circuits are in operation, the position of controls, the performance of vehicle systems and functions and headlamp upper and lower beam selection.

License plate lamp(s). Lamps used to illuminate the license plate on the rear of a vehicle.

Motorcycle headlamp assembly. Consists of a housing with a sealed or semi-sealed optical unit, or a housing that has a separable bulb, lens and reflector, and provides an upper and lower beam filament. A motorcycle may be fitted with not more than two headlamp assemblies that incorporate a means for mounting the assembly securely to the motorcycle and a means to adjust the assembly.

Motor-driven cycle headlamp assembly. Consists of a housing with a sealed or semi-sealed optical unit or a housing that has a separable bulb, lens and reflector, and that provides an upper beam filament or an upper and lower beam filament. A motor-driven cycle may be fitted with not more than two headlamp assemblies that incorporate a means for mounting the assembly securely to the motorcycle and a means to adjust the assembly.

Multiple-beam headlamp. A lamp that incorporates an upper and lower beam.

Operating units and switches. Devices that control the functioning of lamps and electrical equipment.

Reflective devices. Devices used on the vehicle to reflect light from the headlamps of an approaching vehicle to alert the driver of the presence of a vehicle.

Single-beam headlamp. A lamp that incorporates one upper beam only.

Stoplamps. Lamps that give a steady warning light to the rear of a motorcycle indicating that the brakes are being applied. Stoplamps are activated automatically when either the front or rear brakes are applied on motorcycles manufactured on or after January 1, 1972. Note: Activation of stoplamp(s) when the front brake is applied is not required on motorcycles manufactured prior to 1972.

Taillamps. Lamps used to designate the rear of a vehicle.

Turn signal lamp(s). Lamps that provide a flashing warning light to indicate the intended direction of a turn.

1. Lighting Equipment

Lighting requirements in this chapter apply to all factory original, mandatory equipment, replacement equipment and any additional lighting that has been added. If a motorcycle is equipped with a light, it must function properly. All vehicle lighting must meet Canadian Motor Vehicle Safety Standards (CMVSS 108), Federal Motor Vehicle Safety Standards (FMVSS 108) or Society of Automotive Engineers (SAE) standards for lights and signaling devices.

Procedure

Step 1: Inspect the lighting equipment including all lamps and reflective devices to ensure that the vehicle is equipped with all required lighting devices, that all lighting devices function properly and that all lamps and lenses are of an approved type and appropriately

marked. Also inspect all lamps and reflective devices for proper location and secure mounting.

Note: On vehicles without batteries, the engine should be operated at high idle speed to perform lighting tests. Nonworking lamps and bulbs replaced during inspection are not cause for rejection.

Reject the motorcycle if:

- It is not equipped with any required lighting device.
- Any lamp or signal device does not comply with United States or Canadian standards.
- Any bulb or filament fails to light as designed.
- Any lamp, bulb, lens or reflective device is broken, severely discolored or shows color contrary to lighting requirements.
- Any lamp or signal device is improperly located or not securely mounted.
- A motorcycle rated at over 5 horsepower is not equipped with a multiple-beam headlamp.
- Any Canadian motorcycle manufactured after January 1, 1975, is not equipped with daytime running lamps (DRL). The lamps must be located on the front of the motorcycle and must be white in color. They should operate continuously when the engine is operating and the master lighting switch is not in the "ON" position.

Step 2: Inspect the taillamp.

The taillamp must be red and mounted on the rear of the vehicle on the vertical centerline. If two taillamps are used, they must be symmetrically placed about the vertical centerline. The taillamp(s) shall be mounted not less than 15 inches (380 mm) nor more than 72 inches (1830 mm) above the road surface.

Reject the motorcycle if:

- The taillamp(s) do not meet the requirements noted above.

Step 3: Inspect the stoplamp.

The stoplamp must be red in color and mounted on the rear of the vehicle on the vertical centerline. If two stoplamps are used, they must be symmetrically positioned about the vertical centerline. Stoplamps must be mounted not less than 15 inches (380 mm) nor more than 72 inches (1830 mm) above the road surface.

Reject the motorcycle if:

- The stoplamp(s) do not meet the requirements noted above.

Step 4: Inspect the turn signal lamps on motorcycles if so equipped. The front turn signal lamps must be amber in color and mounted on each side of the vertical centerline at the same height. The rear turn signal lamps must be red or amber and one should be mounted on each side of the vertical centerline at the same height.

In the United States, turn signal lamps are required on motorcycles manufactured on or after January 1, 1973.

In Canada, turn signal lamps are required on motorcycles manufactured after October 1, 1973.

Reject the motorcycle if:

- The turn signal lamps do not meet the requirements noted above.

  Note: A motor-driven cycle whose attainable speed in one mile is 30 mph or less does not need to be equipped with turn signal lamps.

Step 5: Inspect the headlamp.

The headlamp must be white in color and mounted on the vertical centerline not less than 22 inches (560 mm) nor more than 54 inches (1370 mm) above the road surface. If two headlamps are used, they must be mounted on the vertical centerline or symmetrically positioned about the vertical centerline.

Reject the motorcycle if:

- The headlamp(s) do not meet the requirements noted above.
- A motorcycle rated at over 5 horsepower is not equipped with a multiple beam headlamp.

Step 6: Inspect the license plate lamp.

The license plate lamp(s) must be white in color and may be combined with other lighting devices.

Reject the motorcycle if:

- The license plate lamp(s) do not meet the requirements noted above.

Step 7: Inspect the reflex reflectors on the rear and sides of the motorcycle.

The rear reflector must be positioned on the vertical centerline, except that if two reflectors are used on the rear, they must be positioned about the centerline. On the sides, one red side reflector must be mounted on each side as far to the rear as practical, and one amber side reflector must be mounted on each side as far forward as practical. All reflex reflectors on either the sides or the rear of the motorcycle must be mounted not less than 15 inches (380 mm) nor more than 60 inches (1520 mm) above the road surface measured from the center of the device. Side reflectors are required on vehicles manufactured after January 1, 1968.

Reject the motorcycle if:

- The reflex reflectors are not positioned properly on the sides or rear of the motorcycle.
- The reflex reflectors are not the proper color.
- The reflex reflectors are mounted less than 15 inches (380 mm) or more than 60 inches (1520 mm) above the road surface measured from the center of the device.

Step 8: Inspect the lighting system. Switch on the driving lights and visually inspect the operation of the turn signal switch and the turn signal lamps for right and left turns, the stoplamp(s), the headlamp(s) on upper and lower beams, the taillamps and all indicator lamps.

Reject the motorcycle if:

- The motorcycle is not equipped with any required lighting device.
- Any lighting device does not function properly.

2. Lighting Equipment for Three-Wheeled Motorcycles

The requirements for lamps, reflective devices and associated equipment on three-wheeled motorcycles are the same as for single-track vehicles.

Specially constructed, reconstructed or highly modified vehicles that are built by combining a motorcycle front fork assembly with an automobile or passenger car rear end must be equipped with rear lighting and reflectors as required for passenger cars.

Reject the motorcycle if:

- It is not equipped with required lighting devices that are properly located.
- The lighting equipment does not operate properly.
- Specialty vehicles are not equipped with required motorcycle lighting equipment to the front and front side with required passenger car lighting equipment to the rear and rear side.

3. Lighting Equipment for Accessory Sidecars

Procedure

Inspect the sidecar for lamps and reflectors as follows:

- The sidecar must be equipped with a tail-stoplamp located on the rear of the "tub" or on the rear of the wheel fender.
- The sidecar tail-stoplamp must be aligned horizontally with the lamp on the motorcycle and must display approximately the same photometric values.
- An amber or white marker lamp may be mounted on the top of the fender or the front at the tip.
- The sidecar may be equipped with a motorcycle auxiliary front lamp or an auxiliary driving lamp, of an approved type, mounted on the front of the tub or the fender.
- One red reflex reflector must be mounted on the outboard side of the sidecar as far to the rear as practical.
- If the sidecar obscures the amber reflex reflector located to the front of the motorcycle then the sidecar must be equipped with a similar amber side reflex reflector located as far to the front as practical.

Reject the motorcycle if:

- The sidecar is not equipped with lamps and reflectors as prescribed.
- The lighting equipment does not operate properly.

4. Headlamp Aim Adjustment

Procedure

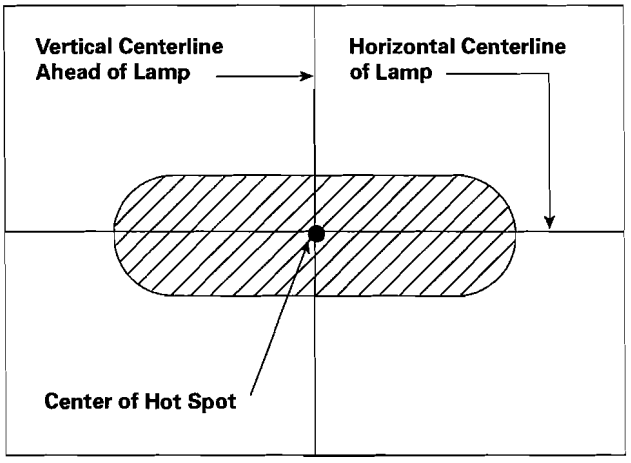
Inspect the aim of the headlamp(s) for proper alignment by using either an approved optical headlamp testing machine, a mechanical aimer or an aiming screen placed 25 feet (7.5 m) in front of the headlamp. Make sure the tires are inflated to the pressure recommended by the manufacturer and adjust if necessary. Conduct the test with the motorcycle in an upright position, with the rider seated in a normal riding position and the front wheel facing straight ahead. If the headlamp is incorrectly adjusted, it should be re-aimed.

Headlamp Aiming Procedures

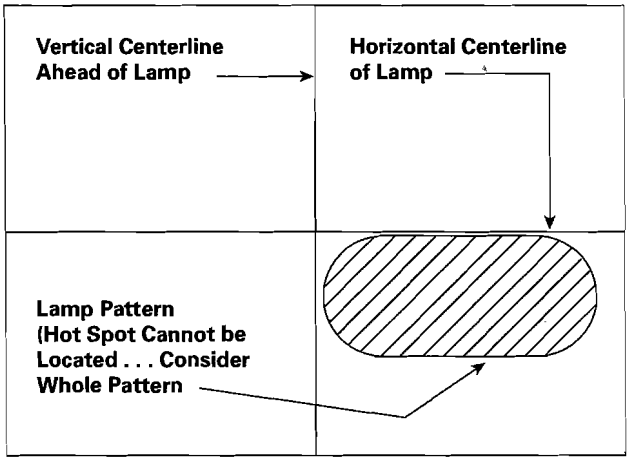
- Composite type lamps incorporating both a high and low beam in the same housing should be checked for alignment on low beam only. If the system uses two separate lamps, one high beam and one low beam, check both lamps for alignment. Alignment tolerances must be within 4 inches (100 mm) of the horizontal and vertical center.
- High beam is aligned with the "hot spot" or center of the high intensity zone centered on the horizontal/vertical (HV) axis that is located at the same height as the headlamp at a distance of 25 feet (7.5 m).
- Low beam is aligned by locating the beam pattern so the upper edge of the high intensity zone is at the horizontal axis and the left edge of the high intensity zone is at the vertical axis. The low beam "hot spot" will be 2 to 4 inches (50 to 100 mm) down and 5 to 8 inches (130 to 200 mm) right of HV.

Reject the motorcycle if:

- The headlamp beam pattern is out of limits and cannot be re-aimed during the inspection.



Headlamp Aiming Procedure—High Beam



Headlamp Aiming Procedure—Low Beam

5. Electrical System

Procedure

Step 1: Inspect the mounting, operation and condition of the horn.

Reject the motorcycle if:

- The horn is not securely mounted or is inaudible.

Step 2: Check all switches to see that they function properly as designed.

Reject the motorcycle if:

- Any switch fails to function as designed.

Step 3: Inspect the wiring and connections.

Reject the motorcycle if:

- Wiring is bare or uninsulated.
- There are loose connections or evidence of a short circuit.

Mirrors & Glazing

1. Rearview Mirror System

Procedure

Visually inspect the rearview mirror(s) and mounting hardware for proper size, location and secureness of mounting.

The rearview mirror may be of either unit magnification or convex construction, with a reflective surface of not less than 12.5 square inches and 10 square inches (320 sq. mm and 250 sq. mm), respectively. The mounting should provide for mirror adjustment by titling both horizontally and vertically. The mirror(s) should be mounted so that the center of the reflective surface is at least 11 inches (28 cm) outward of the longitudinal centerline of the motorcycle.

Reject the motorcycle if:

- The motorcycle is not equipped with at least one rearview mirror as required that meets the above criteria.
- The mirror(s) is not securely mounted or it is broken or has exposed sharp edges.
- The reflective surface is tarnished or peeling.
- The mirror location and adjustment does not provide the operator with an unobstructed view to the rear.

2. Vehicle Glazing

Where safety glazing is required by law, the definition given in American National Standards Institute ANSI Z 26.1-1990 (including Supplement Z26.1a-1969); Canadian Motor Vehicle Safety Standards (CMVSS 205); and Federal Motor Vehicle Safety Standards (FMVSS 205, Glazing Materials, April 1, 1973, as amended) should be used as the basis for regulation and approval of safety glazing materials.

Procedure

Step 1: Windscreens are not required, but if installed, inspect for cracks, discoloration or scratches that obstruct the driver's forward vision. Check to see that it is mounted in a way that does not obstruct the driver's vision, and that an approved glazing has been used.

Reject the motorcycle if:

- The windscreen has cracks, discoloration or scratches that obstruct the driver's forward vision.
- The glazing is not an approved type.
- The windscreen obstructs or obscures the driver's view of the road surface directly ahead of the front wheel.

Passenger Safety Items

1. Handhold

Procedure

Inspect the handhold, if the motorcycle is so equipped, for integrity and secureness of attachment. The handhold may be straps, bars, seat backrests or other types of handhold devices that are provided for passenger use.

Reject the motorcycle if:

- The handhold is not securely attached.

2. Footrests

Procedure

Inspect for the presence and integrity of footrests for each seating position, and for the secureness of attachment and folding capability of passenger footrests.

In the United States, footrests are required for motorcycles manufactured after September 1, 1974.

In Canada, footrests are required on motorcycles manufactured after January 1, 1971.

Reject the motorcycle if

- Footrests are not in an accessible location for the passenger's feet.
- Footrests are not securely attached.
- Footrests do not fold upward, or rearward and upward, when not in use.
- Footrests are missing where originally equipped.

CHAPTER 10

Body Items:

Chain/Belt, Sprocket and Guards, Drive Shaft, Fenders, Stands and Seat

1. Chain/Belt, Sprocket and Guards

The chain/belt and sprocket provide a means by which motive power is transferred from the transmission or torque converter to the rear wheel. The chain/belt guard protects the operator and passenger from contact with the chain.

Procedure

Step 1: Inspect the chain/belt for proper adjustment and wear. Chain slack measurements are made with the motorcycle resting on the center stand, or with both wheels on the surface without rider weight.

Reject the motorcycle if:

- The chain links or rollers are damaged, or the pins are loose.
- The rear chain adjustment is not in accordance with the manufacturer's specifications. If specifications are not available, the following guideline prevails: On "rigid frame models," there should be a minimum of 1/2 inch (12.5 mm) to a maximum of 1 inch (25 mm) total up and down movement measured at a point midway between the two sprockets on the lower section of chain. On "swing-arm models," there should be a minimum of 1/2 inch (12.5 mm) to a maximum of 2 inches (50 mm) total up and down movement measured midway between the two sprockets on the lower section of the chain.

Step 2: Inspect the sprocket for wear and for bent or missing teeth.

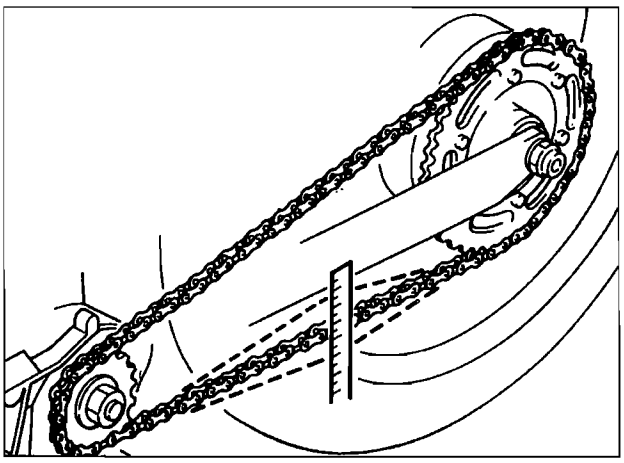
Reject the motorcycle if:

- The belt is frayed or teeth are stripped.
- Sprocket teeth are bent or missing.
- The rear sprocket is loose, missing bolts or cracked.

Step 3: Inspect the chain/belt guard for secureness of mounting and proper coverage.

Reject the motorcycle if:

- The chain guard is broken or missing.
- The chain guard is not securely mounted or is not mounted in a way that provides shielding from the chain.



Drive Chain Slack Measurement.

2. Drive Shaft

Procedure

Inspect the drive shaft housing for leakage.

Reject the motorcycle if:

- The drive shaft is leaking fluid.

3. Fenders

Fenders provide a shield over the wheels to protect the rider, passenger and following vehicles from foreign objects thrown by the rotating tire.

Procedure

Inspect the fenders for secureness of mounting, cracks, broken areas or sharp edges. Each wheel should be equipped with a fender.

Reject the motorcycle if:

- Fenders are missing from either wheel.
- Fenders are not mounted securely or have exposed sharp edges.

4. Stands

Procedure

Inspect the side and center stands in both up and down positions for proper holding and structural integrity.

Note: The center stand and the side stand are retractable parking devices designed to provide support for an unattended motorcycle. A motorcycle may be equipped with either a side stand, a center stand or both.

Reject the motorcycle if:

- The motorcycle does not remain on the stand when the front wheel is turned from stop to stop. **Note:** Use caution to prevent the motorcycle from falling off the stand.
- Either stand is cracked or broken.
- The stand will not fully retract or remain in the fully retracted or stored position.

5. Seat

Procedure

Inspect the seat for secureness of mounting and proper function of the seat-locking device.

Reject the motorcycle if:

- The seat is not securely attached.
- The seat latching or securing device does not function properly.

Bolt-On Accessories

Bolt-on accessories include, but are not limited to, such items as fairings/windshields, luggage racks and carriers, backrests, highway bars, engine case guards, passenger seats, speedometers/odometers, and trailer hitches.

Procedure

Step 1: Visually inspect accessory components for secure mounting and location so as not to interfere with the operation of the motorcycle or its essential equipment.

Reject the motorcycle if:

- Bolt-on accessories interfere with, obstruct or prevent proper use of any control, component or system required for the operation of the motorcycle.
- Items cover, interfere with or obstruct any required lighting device, reflector or registration plate.

Step 2: Visually inspect components for cracks, breaks and sharp points or edges that present a hazard.

Reject the motorcycle if:

- Bolt-on accessories have sharp edges, points or breaks that may present a hazard to the driver, a passenger or a pedestrian.

CHAPTER 12

Sound Level Testing

1. Sound Level Compliance

Procedure

Inspect the motorcycle for sound level compliance using the stationary test method, Society of Automotive Engineers SAE J1287 JUN93.

Reject the motorcycle if:

- The sound level exceeds 99 dB measured at 20 inches (510 mm) in accordance with procedures specified by SAEJ1287.

2. Stationary Motorcycle Noise Testing Procedure (SAEJ1287 JUN93)

The stationary sound test procedure described herein has been approved by the Society of Automotive Engineers and is the most useful and accurate means available for sound testing of motorcycles in the field. This procedure when used for the enforcement of in-use motorcycle standards is intended to be a pass-fail test to screen out those vehicles that are excessive noise emitters

Instrumentation

a. A sound level meter that meets the type 1 or type 2 requirements of the American National Standards Institute (ANSI) Specification for Sound Level Meters, S1.4 –1983.

b. A sound level calibrator with an accuracy of plus or minus 0.5 dB.

c. A microphone windscreen.

d. An engine speed tachometer with a steady state accuracy of plus or minus 3 percent at the test rpm.

Test Site

a. The test site should be a flat, open, hard surface, free of large sound reflecting objects located within 16 feet (5 m) of the motorcycle being tested and the microphone. This test cannot be conducted inside the inspection bay.

Procedure

a. The rider should sit astride the motorcycle with both feet on the ground to keep the vehicle vertical and stationary.

b. With the transmission in neutral, the rider should run the engine at a speed equal to one-half of the redline speed. (Redline speed is the lowest numerical rpm included in the red zone of the motorcycle tachometer.) This is established as the test rpm and should be maintained within plus or minus 200 rpm. An external vibrating reed or electronic induction tachometer should be used if the installed tachometer is inoperative.

c. The motorcycle engine must be within normal operating temperature range during the test.

Measurement

a. Calibrate the sound level meter using the sound level calibrator prior to the first test of the day.

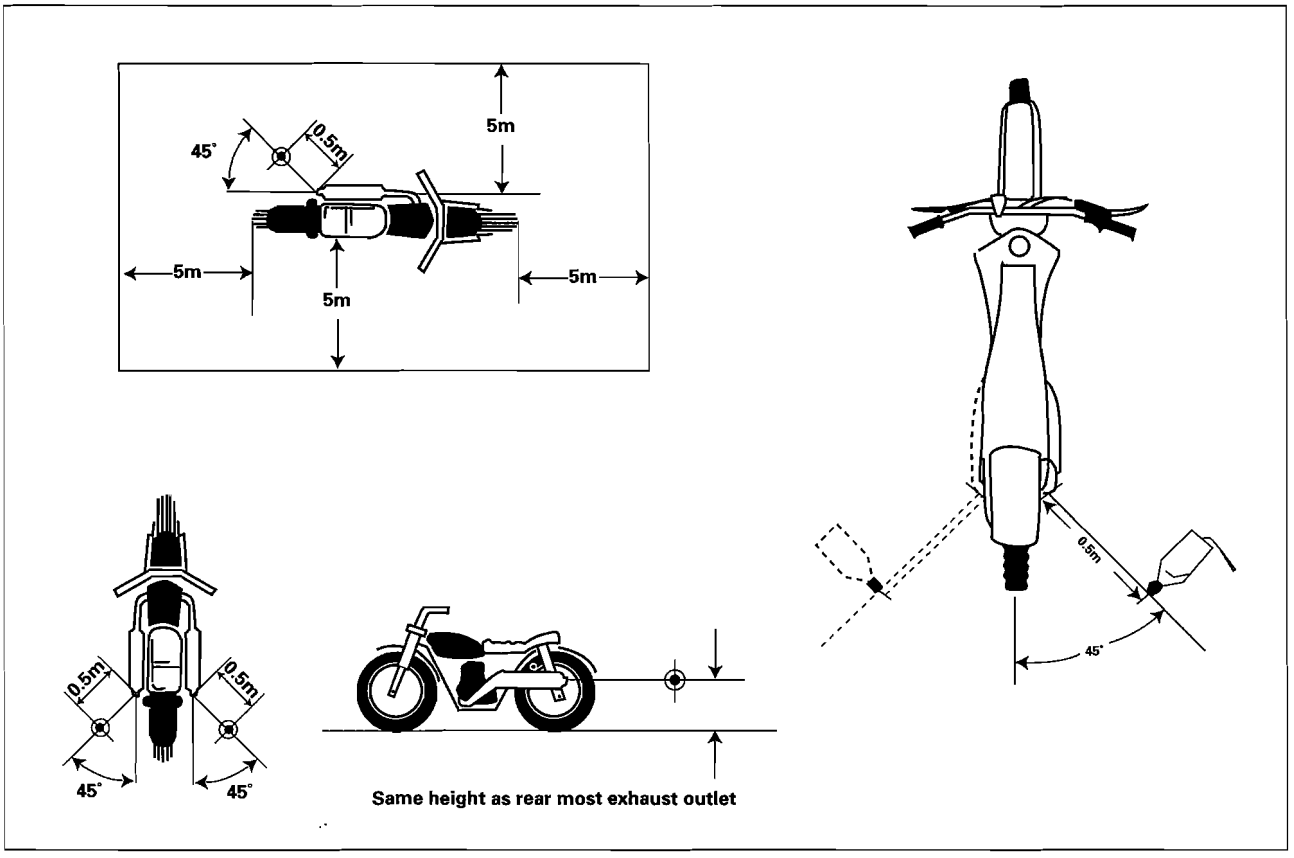
b. Set the sound level meter on the A-weighting scale and for slow dynamic response.

c. The microphone must be located at a point 20 inches (0.5 m) from the rear most exhaust outlet to be measured, along an imaginary line extending rearward at an angle of 45 degrees. The meter must be held level with the ground at the same height as the exhaust outlet and oriented as specified for free field response by the man-

ufacturer. The meter typically will not be pointed directly toward the exhaust outlet. Do not attach any wire or other rigid material for establishing distance measurement to the meter. (See Diagrams of the Motorcycle and Microphone Arrangements below.)

d. Operate the engine at the predetermined rpm and record the sound level reading. If there are exhaust outlets on both sides of the motorcycle, measurements must be taken for both. For marginal vehicles, two measurements may be taken for each outlet measured and averaged.

e. While making measurements, the ambient sound level at the site must be at least 10dB lower than the sound level of the motorcycle being tested; the wind speed must be less than 20 mph (32 km/h); and the site must be clear of all persons not engaged in the testing, within a 10 foot (3 m) radius.



Noise Testing: Diagrams of the Motorcycle and Microphone Arrangements.

About the Publishers

American Association of Motor Vehicle Administrators

Founded in 1933, AAMVA is a nonprofit, educational organization representing state and provincial motor vehicle and law enforcement agencies throughout the United States and Canada.

AAMVA's programs encourage uniformity and reciprocity among the states and provinces, and promote liaison activities with other levels of government and the private sector. AAMVA also stresses highway safety through its involvement in numerous national coalitions, and its program and research activities provide guidelines for more effective public service.

Association members include all United States and Canadian jurisdictions plus American Samoa, Guam, Puerto Rico and the Virgin Islands. AAMVA associate members include organizations, associations and business enterprises with interests compatible with AAMVA and its program objectives.

Canadian Council of Motor Transport Administrators

Established by the provincial, territorial and federal governments, CCMTA is a nonprofit organization that promotes understanding and cooperation in all matters concerning the administration, regulation and control of motor vehicle transportation and safety in Canada.

CCMTA reports to the Council of Ministers Responsible for Transportation and Highway Safety and is responsible for motor vehicle registration, driver licensing, road safety programs, motor carrier regulatory issues, compliance activities for commercial vehicles and drivers, and other transportation projects and agreements.

Members include senior representatives from all of the provincial and territorial governments, as well as representatives from the federal government. Private industry organizations and other government agencies in Canada and the United States participate as associate members.

American Association of Motor Vehicle Administrators
4301 Wilson Blvd., Suite 400, Arlington, VA 22203
703-522-4200
www.aamva.org

CCMTA • CCATM

Canadian Council of Motor Transport Administrators
2323 St Laurent Blvd., Ottawa, Ontario KIG 4J8
613-736-1003
www.ccmta.com